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(54) Title: CALL SETUP IN MOBILE SYSTEMS

(57) Abstract

The invention relates to a method at a mobile tele and data communication system, which makes possible for an A-subscriber to transmit data to an application in the B-subscriber's mobile terminal in connection with the call setup. Examples of transferred data can be information which in the B-subscriber's mobile terminal executes a specific ringing melody, a personal logotype etc. The invention is characterized in that UUS is used as carrier to, at the setup, transfer this data information to the application in the B-subscriber's mobile terminal.

TITLE OF THE INVENTION: CALL SETUP IN MOBILE SYSTEMS

Field of the invention

The present invention relates to a method at a mobile
5   tele and data communication system for call setup between an
A-subscriber and a B-subscriber.

Prior art

In the GSM of today there is no possibility for a GSM-
10 user to, at calling, transfer a personal ringing signal to a
receiving GSM-mobile. In Nokia´s "Smart Messaging"-concept a
user can collect a ringing signal to his/her own Nokia 8110
via the radio interface, but cannot transmit a ringing
signal at calling another GSM-customer. Neither can the
15 user, at the setup of a call, transfer an application which,
for instance, might be a personal graphic symbol, a simple
moving graphic picture, or a hypertext page, which can be
shown on the display of the receiving GSM-mobile. Moreover,
there is no possibility to authenticate a user already at
20 the setup of the call. One, or possibly all, of these
functions would certainly become very popular services in
GSM if they would be realized.

The problem consequently can be summarized in that an
A-subscriber cannot transmit data to an application in the
25 B-subscriber´s mobile in connection with the setup of the
call. Examples of data may be a specific ringing melody, a
personal logotype etc.

The aim of the following invention consequently is to
solve this problem.
30

Summary of the invention

The above mentioned aim is achieved by a method at a
mobile tele and data communication system for setup of call
between an A-subscriber and a B-subscriber, where UUS is
35 used as carrier to, at said setup of call, transfer data
information to an application at said B-subscriber.

A big advantage of the invention is that it can be used
to differentiate the service offering of different
operators. Operators can offer new, attractive service
functions, which of course will increase their revenues.

Further characteristics of the invention are given in
the subclaims.

In the following a detailed description of an
embodiment of the invention is given.

Detailed description of the invention

With today's technology data to an application in the
B-subcriber's mobile cannot, as has been mentioned above, be
transferred at setup of a call, for instance a personal
ringing melody which is played instead of a default ringing
signal, that a personal logotype is shown on the receiver's
display, or that an authentication can be made already at
the setup of a call.

The invention attends to this by means of the functions
which now will be described below.

SIM Application Toolkit is included in GSM phase 2+,
and i.a. gives SIM possibility to show text in mobile
display, transmit SMS, establish call, transmit USSD-
string, initiate dialogue with mobile users and
mechanism to transfer data to SIM from the network.
USSD stands for Unstructured Supplementary Services
Data, and is a data channel which can be used to
transmit data between network and mobile. In phase 2+
USSD is developed to become a general carrier.

Java Card API is a java standard which has been
developed for smart cards (for instance GSM's SIM is a
smart card). Java Card API makes it possible to
implement a java interpreter on the SIM, which i.a.
results in that the operator has possibility to either
download an own-developed java application on the card,

before it is handed over to the customer, or load down
an application via, for instance, SMS. Together with
SIM Application Toolkit, there will be possibilities to
develop very advanced functions and applications.

Embedded Java, Personal Java, are java standards which
have been developed to be used in products with limited
processor capacity and memory. A typical product can be
a mobile telephone. The mobile manufacturer has for a
long time worked with Java in the mobile terminal, but
now also work within ETSI has started to achieve a
standard. Within a few years all "high end" telephones
will support Java (according to well-informed sources
at Ericsson Mobile). Java applications can be
transferred to the mobile in a number of different
ways: from SIM (where for instance an operator specific
application can be located), via SMS, USSD, GPRS, or
data from the network, and via i.a. UUS from another
user.

UUS (User to User Signalling): The function is
inherited from ISD and supports transmission of smaller
amounts of user data at the setup, during call, and at
the termination of the call. In the case with UUS at
the setup, there is a field specified in the "SET UP"-
message, where up to 35 octets of user information can
be transferred to the B-subscriber. During a call, one
or more continuous packets of 131 octets of user data
can be transferred on the main signalling channel,
FACCH.

The invention also can be used in another or future
system where there are, or will be, functions similar to
those described above. One example is ISDN, where the
functionality already exists.

Provided that the GSM-mobile and SIM supports Java, SIM
Application Toolkit and UUS, the problems above can be
solved in the following way.

5   1.   A GSM-user establishes a connection towards a
            GSM-mobile. By USS a frame, max. 35 octets long,
            consisting of an information header (of one or
            two octets) and a data field, is transferred.
            The information in the header can consist of
10   application as well as how many octets user data
            the frame contains. It means that the maximal
            amount of application data which can be
            transferred to an application in the B-
            subscriber´s GSM-telephone consists of 33 or 34
15   octets.

       2.   When the receiving side detects that the SET-UP-
            message contains a UUS-data field, the UUS data is
            transferred to an application in the mobile (or
            the SIM) which reads the data header, where
20   information exists about which application at the
            SIM, or in the mobiles that shall be started.

       3.   The application, which establishes the call and
            transmits the UUS-message, can use SIM
            Application Toolkit to manage call setup, provided
25   that SIM Application Toolkit is extended with
            functionality for UUS. Similar functionality,
            however, will exist via the Java interpreter in
            the mobile.

30 The invention is characterized in:

    -    that UUS (User to User Signalling) is used as carrier
         to, at the setup, transfer data information to an
         application in called GSM-mobile;

35

- that the data frame, which at setup is maximally 35
  octets, consists of a header containing information
  about application, length of user data, etc, and of a
  user data field, 33 or 34 octets;

5

- that one application at the A-subscriber establishes a
  call setup where a UUS-data packet is incorporated;

- that one application at the B-subscriber, on basis of
10 the header information in the UUS-packet, can decide
  requested application and start this application in the
  B-subscriber´s mobile;

- that the applications are developed in Java, or other
15 suitable language;

- that one application is that a user can define his/her
  own personal melody, which at setup of call is
  transmitted to the B-subscriber´s mobile, where it is
20 played back, instead of default ringing signal;

- that one application is that a graphic symbol, moving
  or static, is shown on the B-subscriber´s mobile. For a
  moving picture, a library of movement patterns is
25 required in receiving application;

- that one application is authentication of the A-
  subscriber already at setup;

30 - that UUS is defined also for ISDN, so the invention can
  be used also in environment with only ISDN or ISDN-GSM;

- that the invention, as a whole or parts of it, applies
  to present and future mobile telephone systems with
35 similar functionality;

-       that the applications can be downloaded on SIM-cards,
        by the operator, already at subscription.

-       In the following a number of examples of possible
        applications of the invention are given:

-       An A-subscriber´s personal ringing signal is
        transferred and played back as ringing signal in the B-
        subscriber´s GSM mobile telephone:

        - In the A-subscriber´s mobile, an application is
        required which can set up a call which includes a UUS-
        data packet.

        - In the B-subscriber´s mobile, one or two applications
        are required (can, but must not necessarily be a Java
        application) which from the header information of the
        data frame can decide which application that is
        intended and start that application, here a ringing
        signal application, with the user data in the frame as
        in-argument. Because the maximal amount of data that
        UUS can transmit at call setup is 35 octes, more than
        35 tones can be transferred, where each tone, tone
        pitch and duration can be described by 6 or 7 bits.

        The application instead can consist of a simple
        bitmapped symbol which moves across the screen. The
        symbol can, for instance, consist of 32 octets (for
        instance a 16x16 bits picture), at which other data can
        be used to select a movement pattern from a library
        which is in the B-subscriber´s application.

        Together with a mobile-adapted WWW-browser, a short
        hypertext page can be transferred to the mobile, where
        the B-subscriber with a pointer marks a line, and by
        means of USSD in SMS transmits a request about to get,

via SMS or USSD (or possibly UUS), wanted information.
On the receiving side, an application that can reformat
the only 33 or 34 octet long information to suitable
format, is required.

A security application can be used to authenticate a
calling mobile already at the call setup. It can be
used, for instance, at access to its bank, access to a
premises network, or even for authenticating a person
who is calling another GSM-mobile.

The application in the mobile, alternatively the SIM-
card, may require that a password is stated before the
call is set up. In the future - depending on when the
technology is ready for implementation in GSM - the
application in the mobile can, instead of a password,
use voice authentication to identify the A-subscriber
before the call is set up. After correct password being
entered, the application works out a code word, based
on, for instance, IMSI, the password (alt. approved
voice authentication) and code key (stored in the
application). The code word is transferred, via UUS to
a receiver application on the other side, which has
access to code key and list of user identities. The
receiver by that can authenticate the calling
subscriber via the transferred code word.

The application which, for instance, a bank customer
uses in such a process can be transferred from the bank
to him/her via, for instance, USSD or SMS. A code word
for the application is communicated to the bank
customer in another way. In the same way a mobile
subscriber can transmit a security application to
another mobile subscriber.

Specific applications can be operator specific by downloading these on the SIM-cards when the customer subscribe. This make possibilites for differentiation.

5   Since the processor capacity of the SIM of today is limited, the application possibly has to be transferred from the memory in SIM to a memory in the mobile, from where the application later can be run via, for instance, a Java interpreter in the mobile. Data from

10   the UUS-message can be enclosed as argument to the application.

Another method, which can be used to transfer an application to a mobile, can be from an Internet server

15   via mobile-adapted WWW-browser. One example is "Smart Messaging", which is Nokia´s name for a WWW-similar application which can be run in a mobile, where data can be transferred via SMS or USSD.

20   Further, an application can be downloaded to the telephone via the serial interface of the mobile.

The application must be possible to switch off, in order to retrieve the normal ringing signal behaviour

25   when the user so wishes.

The above mentioned is only to be regarded as an advantageous embodiment of the invention, and the extent of the invention is only defined by what is indicated in the

30   following patent claims.

PATENT CLAIMS

1. Method at a mobile tele and data communication
system for call setup between an A-subscriber and a B-
subscriber, c h a r a c t e r i z e d in that UUS is used as
carrier to, at said call setup, transfer data information to
at least one application at said B-subscriber.

2. Method according to patent claim 1,
c h a r a c t e r i z e d in that said data information
consists of a data frame including a header and a data
field, at which said header contains information about which
application at said B-subscriber that is intended, and that
said data field constitutes in-argument to said application
for execution of said at least one application at said B-
subscriber.

3. Method according to any of the patent claims 1 or 2,
c h a r a c t e r i z e d in that said at least one
application is implemented in a SIM-card at the B-
subscriber´s mobile terminal.

4. Method according to the patent claims 1 or 2,
c h a r a c t e r i z e d in that the A-subscriber´s mobile
terminal utilizes SIM Application Toolkit to transfer said
data information to said B-subscriber´s mobile terminal.

5. Method according to the patent claims 3, or 4,
c h a r a c t e r i z e d in that said at least one
application is developed in Java.

6. Method according to patent claim 5,
c h a r a c t e r i z e d in that JAVA-applications are
transferred to said A-subscriber´s, respective B-
subscriber´s, mobile terminals via SMS, USSD or GPRS.

7. Method according to any of the previous patent
claims, c h a r a c t e r i z e d in that said mobile
terminals are GSM-terminals with SIM-cards which support
JAVA, SIM Application Toolkit and UUS.

8. Method according to patent claim 7,

c h a r a c t e r i z e d in that it includes the steps
that:

- said A-subscriber´s GSM-terminal establishes a call
  towards said B-subscriber´s GSM-terminal, at which a
  SIM Application Toolkit function is extended with
  functionality for UUS and attends to transfer of said
  data information, i.e the UUS-message, to said B-
  subscriber´s mobile terminal;

- said B-subscriber´s mobile terminal detects said data
  information, and said header in said data information
  defines which application that shall be executed, and
  that said data field in said data information
  constitutes in-parameter to said application which
  shall be executed in the B-subscriber´s mobile
  terminal.

9. Method according to any of the previous patent
claims, c h a r a c t e r i z e d in that said application
is that said A-subscriber can define his/her own personal
melody which at call setup is transferred to said B-
subscriber´s mobile terminal, where said melody is played.

10. Method according to any of the claims 1-8,
c h a r a c t e r i z e d in that said application relates
to an authentication of said A-subscriber directly at the
call setup towards said B-subscriber.

11. Method according to patent claim 10,
c h a r a c t e r i z e d in that said application relates
to that a password is given before the call is set up
towards said B-subscriber.

12. Method according to patent claim 10,

c h a r a c t e r i z e d in that said application relates
to voice authentication to identify said A-subscriber,
before the call is set up towards said B-subscriber.